

Q4. Transportation

Uncertainties/Issues:

- two components of mortality of transported fish:
 - Direct barge mortality (2% in both passage models)
 - Delayed mortality of transported fish
- Uncertainty in survival of control fish; same Transport:control data used by both groups¹

Implementation:

- Delayed component (D) differs between passage models

	CRiSP	FLUSH
Historical	Assumes large increase after 1980	D relatively constant pre/post 1980
Future projections	Based on post-1980 D values	Based on all D values

- Analysis using other estimates of D proposed for FY99

Implications:

- Transportation assumptions have large effect on spawner projections and jeopardy standards

¹ WOE Table D-1, Fig. D-10, Fig. D-17

Evidence related to CRiSP:

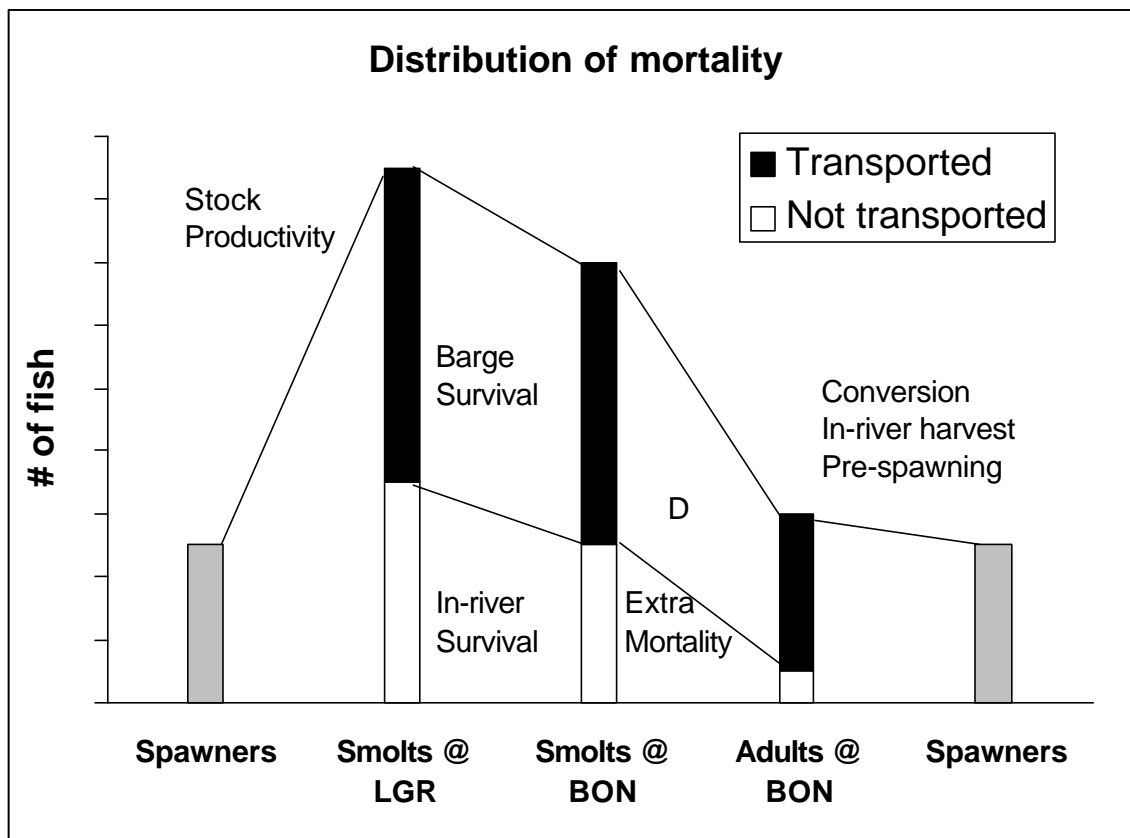
- CRiSP D estimates account for improvement in transportation conditions (reduction in descaling) since 1980
 - ⇒ *Descaling problems continue since 1980*
 - ⇒ *Incremental mortality of Snake R. fish relative to lower Columbia has not decreased over time*

Evidence related to FLUSH:

- Low D assumption more consistent with spawner-recruit data²
 - ⇒ *Low D assumption was inconsistent with spawner-recruit data in years with high passage survival (early 1980's)*
- Low D assumption more consistent with SAR data³
 - ⇒ *SARs affected by other factors that have changed over time*

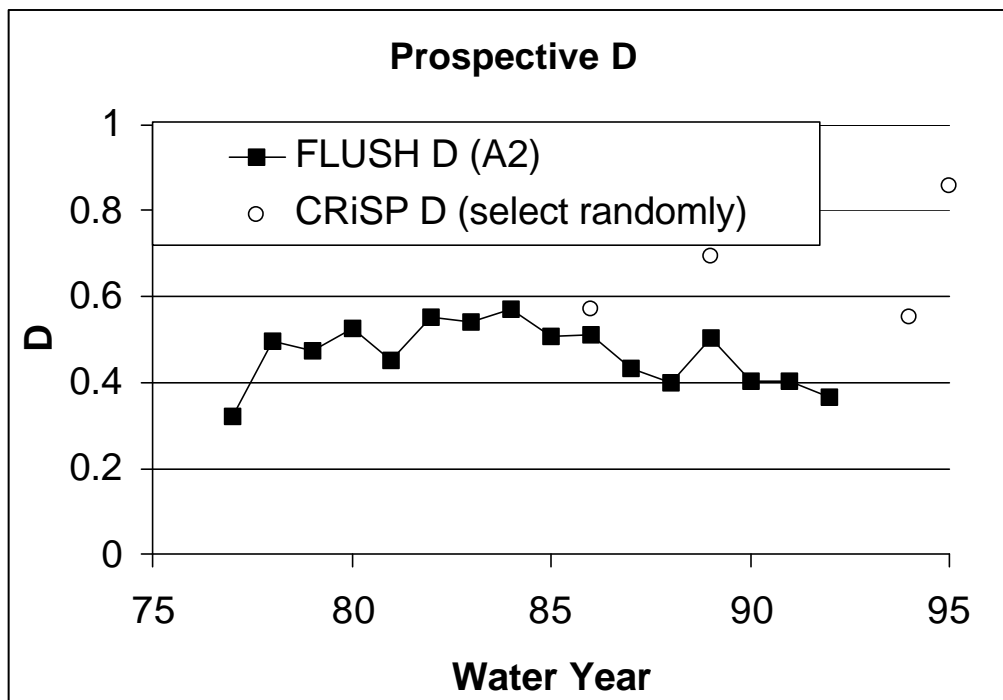
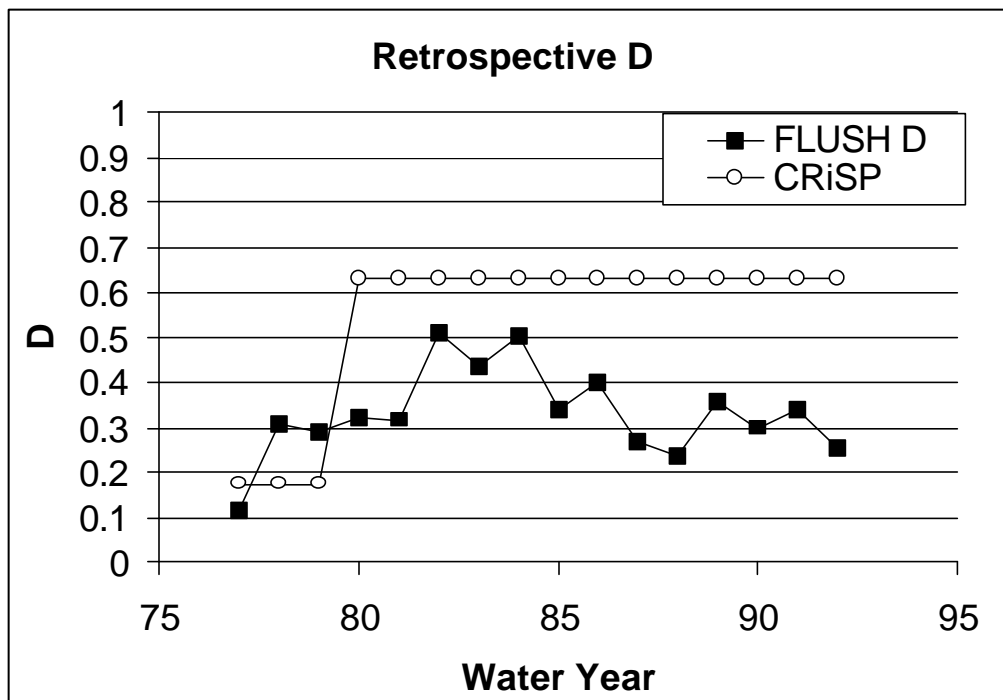
² WOE Submission 22 p. 19, FY96 Ch. 5 Fig. 5-5

³ WOE Fig. 4-5

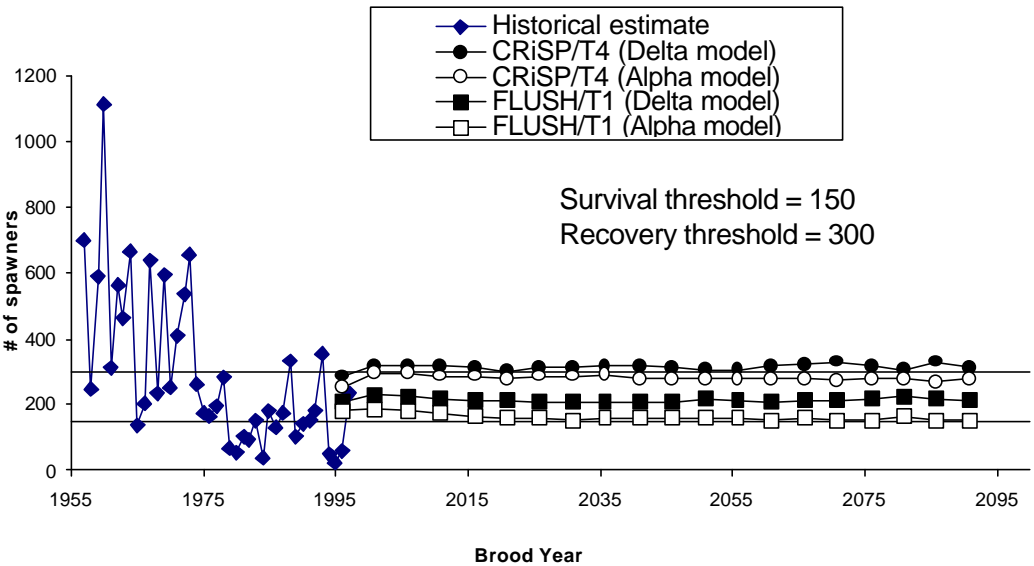


D = Relative survival of transported fish

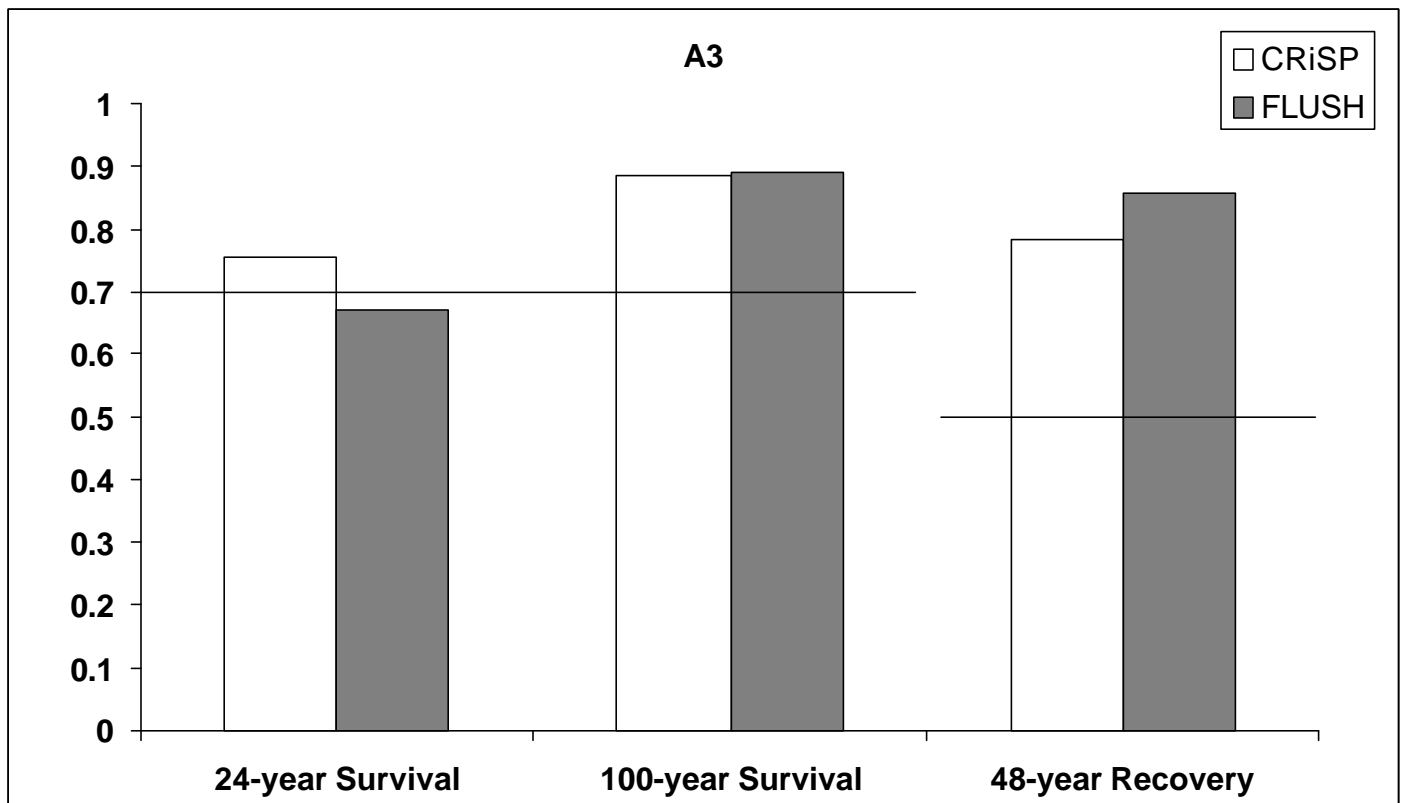
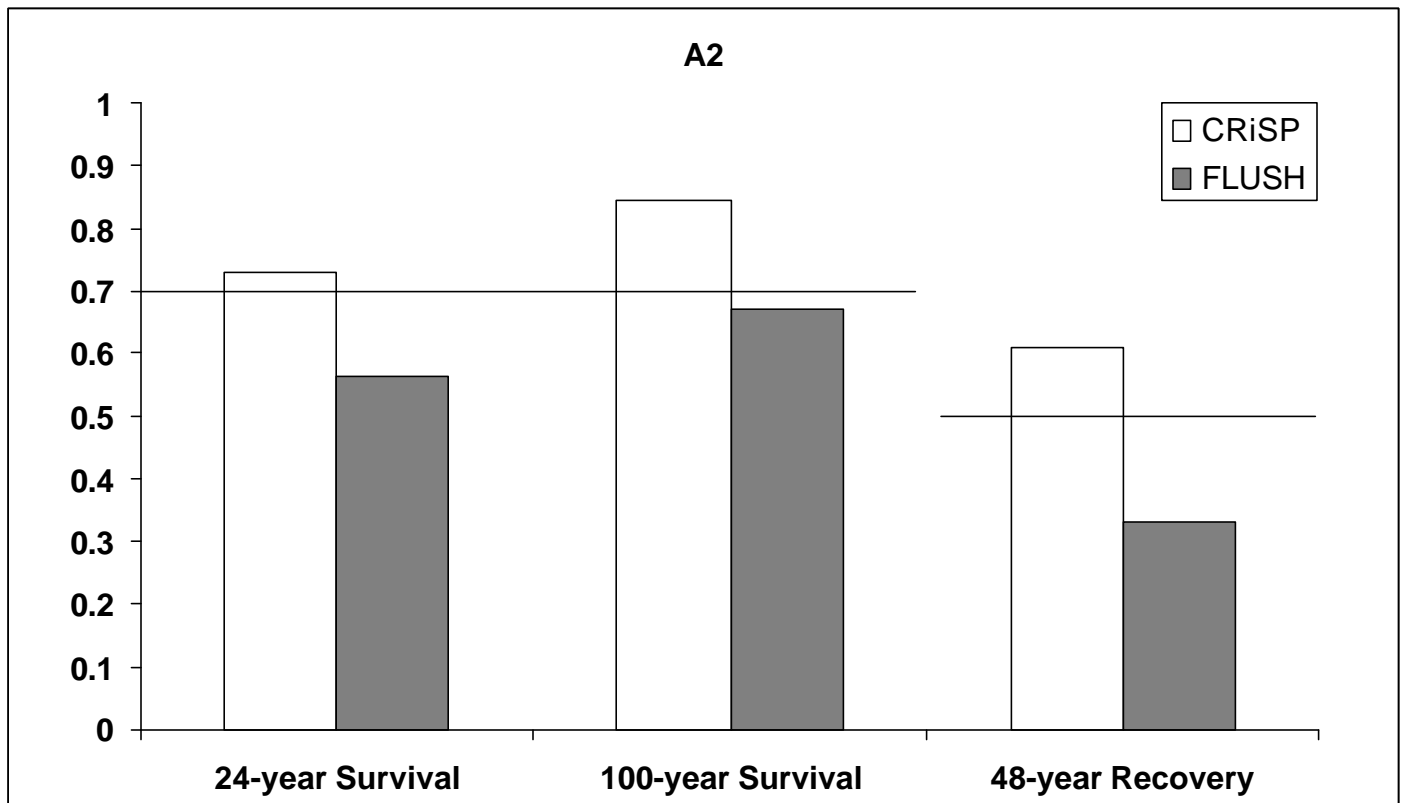
$$\begin{array}{ccccc}
 \text{Relative survival of transported fish from LGR back to LGR} & = & \text{Relative survival of transported fish from LGR to BON} & \times & \text{Relative survival of transported fish from BON back to LGR} \\
 \uparrow & & \uparrow & & \uparrow \\
 \text{Transport:Control (data)} & & \frac{\text{Barge survival (0.98)}}{\text{Survival of control fish (estimated)}} & & \text{"D" (estimated)}
 \end{array}$$



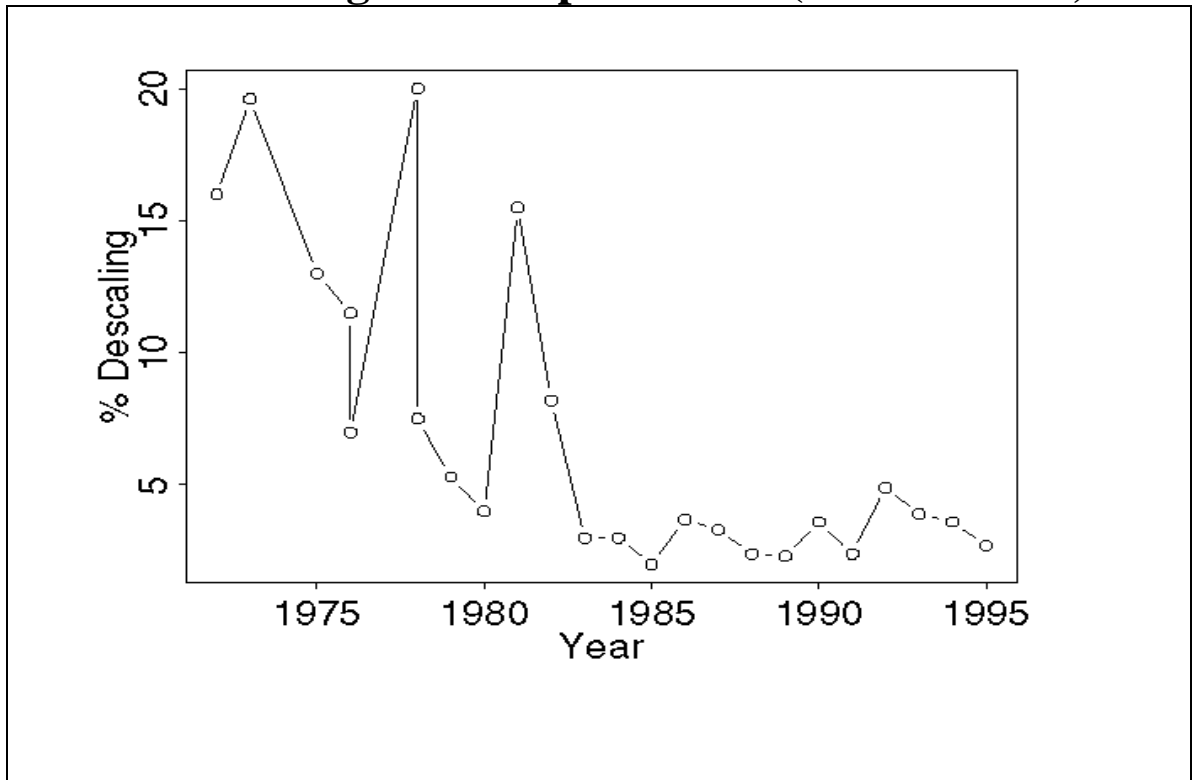
Median Projected Johnson Creek Spawners
(A1, BKD extra mortality /Markov future climate hypothesis)



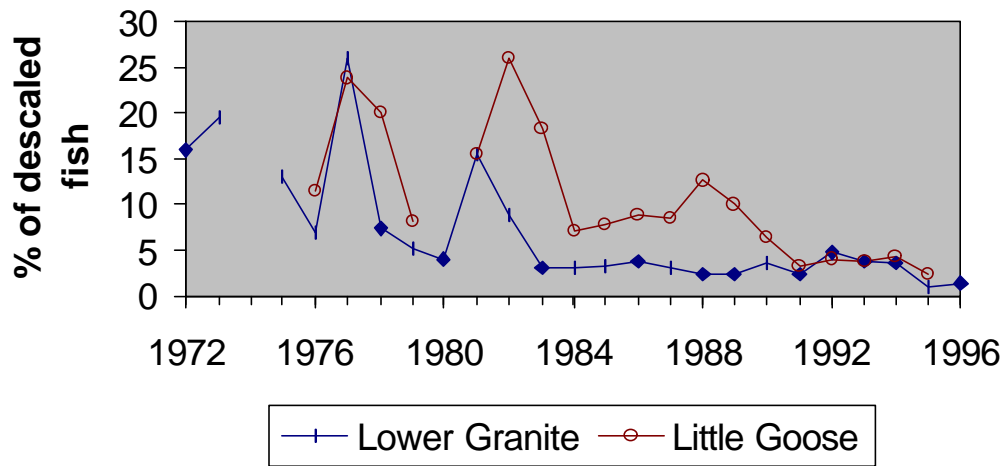
Effects of transportation assumptions



Percent Descaling at Transport Dams (LGR or LGS)



Percent of descaled juvenile chinook



Incremental mortality of Snake River stocks (vs. lower Columbia River stocks)

